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New species and records of Tettigoniidae Krauss, 1902 from the Papuan Region (Orthoptera)

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Abstract: The article is based on Tettigoniidae collected during expeditions to West Papua and Misool Island in 2009, 2012 and 2018, deposited in the Naturkundemuseum Erfurt. Three species of the tribe Sexavaini within the subfamily Mecopodinae, are described as new: *Phrictaetypus brevispina* sp. nov. from Tamarau Mountains, *Huona inarmata* sp. nov. from Biak Island, and *Mossula striatifrons* sp. nov. from the Star Mountains. New records for six species of Agraeciini within the subfamily Conocephalinae are reported, of which *Pseudonicsara (Cercana) spinibranchis* Ingrisch, 2009 and *Rhytidaspis camela* Ingrisch, 2019 are new records for Misool Island. The female of *R. camela* is described for the first time.

Key words: Mecopodinae, Sexavini, Conocephalinae, Agraeciini, new species, new records, New Guinea, Misool, Biak.

Introduction

The Tettigoniidae Krauss, 1902 fauna of New Guinea is still fragmentary known although many species of this family are rather large insects. A search for "Tettigoniidae from Papuasia" (including New Guinea, Bismarck Archipelago and the Solomon Islands) in the online database Orthoptera Species File (Cigliano *et al*. 2020) revealed a list of 454 species, of which more than half belong to the Conocephalinae Burmeister, 1838 for which a few modern revisions exist (239 species with 16 species in Conocephalini Burmeister, 1838, 223 in Agraeciini Redtenbacher, 1891). The Mecopodinae Walker, 1871 were listed with 44 species. Other subfamilies which were reported but not dealt with in this publication are: Meconematinae Burmeister, 1838 with 59 species, mostly Phisidini Jin, 1987 that have been revised by Jin & Kevan (1992), Phaneropterinae Burmeister, 1838 with 44 species, Phyllophorinae Stål, 1874 with 42 species, Pseudophyllinae Burmeister, 1838 with 18 species, and Hexacentrinae Karny, 1925 with eight species. Thus only seven of the currently recognized 19 extant subfamilies have been reported from that area. At least for some of these subfamilies equally high numbers of species as in Conocephalinae or even higher numbers could be expected, which shows the poor knowledge on the tettigoniid fauna of the area.

The recent expeditions to New Guinea and Misool Island took place in 2009, 2012, and 2018. The Tettigoniidae specimens studied comprised species of two taxonomic groups: genus group Mossulae Willemse, 1961 of the tribe Sexavaini Karny, 1924 within Mecopodinae and the tribe Agraeciini Redtenbacher, 1891 of Conocephalinae. The last revisionary work on the Mossulae group to which the new species belong was finished by Willemse (1961), while for some of the New Guinean Agraeciini, revisions of several genera had been made by Willemse (1959) and the author (Ingrisch 2008; 2009; 2015; 2019; 2020). In the last-mentioned publication also a new species from the collection of D. Telnov has been described, *Salomona lanigera* Ingrisch, 2020, as it was reasonable to publish it together with other species of the same genus.

For the Mecopodinae from South East Asia, it has been recently shown that acoustic communication by stridulation and the stridulatory apparatus with the stridulatory file on the underside of the left male tegmen and the scrapper and mirror of the right male tegmen are important taxonomic characters (Liu *et al.* 2020). For the Agraeciini more traditional characters as differences in the male and female abdominal appendages like male cerci and sclerotized parts of the male phallus, the titillators, and the female subgenital plate are useful characters to differentiate between species.

Material and methods

The specimens were dry pinned or affixed when received. They were relaxed and the wings spread when necessary to study the stridulatory apparatus in Sexavini or to extract the male titillators in Agraeciini. The specimens of the Mossulae group studied for this publication do not have slerotized titillators on the phallus. Documentation of the specimens studied was done by photography using a Canon D500 mounted to a copy stand for habitus images and a Canon D6 mounted to the photo adapter of a Motic M5 for microscopic images. The images were processed with CaptureOne and stacked with Zerene Stacker. Habitus images were photographed together with a piece of scale paper. Microscopic images were done at one of four fixed magnifications. For each magnification also a micrometer was photographed that allowed to add scales to the finished images.

Types of the new species are deposited at the Naturkundemuseum Erfurt, Germany (NMEG). Voucher specimens for the new records that are not types are deposited in the same collection.

Results

New descriptions

Tettigoniidae Krauss, 1902
Mecopodinae Walker, 1871
Sexavaini Karny, 1924
Mossulae group

Phrictaetypus Brunner von Wattenwyl, 1898

Four species were previously known (Cigliano *et al.* 2020): *P. viridis* Brunner, 1898 from New Guinea without exact locality, *P. nigroornatus* Willemse, 1940 from “Solomon Is., Makira, Kirakira”, *P. flavoornatus* Willemse, 1953 from “Bougainville Island, Buin”, and *P. aberrans* Willemse, 1961 from “Bougainville”.

***Phrictaetypus brevispina* sp. nov.** (Figs 1, 16–19)
Holotype ♀ (3261563) NMEG: Indonesia E, West Papua, Tamarau Mts., ca 12 km NW Fef vill., 0°46’5’’S, 132°19’6’’E, 1050 m, 12-13.ii.2012, primeval lower montane rain forest, MV light.

Derivatio nominis: The name of the new species refers to the short spines at the lateral angles of the pronotum compared to the long spines in other species of the genus; from Latin “*brevis*” (short) and “*spina*” (spine).

Measurements, holotype ♀: Body length with wings 68 mm, body length without wings 37 mm, pronotum length 6.2 mm, tegmen length 59 mm, tegmen width 10 mm, hind femur length 28 mm, antenna length 90 mm, ovipositor length 16 mm.

Description. Long and slender species with long, narrow tegmen almost reaching tip of stretched hind tibia. Head rather small with eyes strongly protruding laterally. Fastigium verticis narrow, furrowed at tip, separated by a narrow furrow from fastigium frontis; lateral ocelli inserted at lateral margins of fastigium verticis, medial ocellus below fastigium frontis; antennal scrobae with inner margin moderately expanded dorsad (Fig. 17). Pronotum divided by two deep furrows into three sections, the last section with an additional furrow restricted to disc; disc strongly rugose and with angular and slightly projecting lateral margins; lateral margins provided with four short blunt spines: one in first section, two in second section, and one at beginning of third section; median keel rather large but blunt, interrupted by the main transverse furrows, reaching from anterior margin to just behind the additional furrow in metazona and interrupts that furrow in middle (Fig. 1). Prosternum with a pair of spine-like projections, little curved laterad; mesosternum with parallel, band-shaped projections that towards end are curved latero-dorsad; metasternum with ventral surface nearly smooth but little wavy, lateral margins forming elevated rims becoming higher towards end (Fig. 16). Tegmen long and narrow, in basal and central areas faintly narrower than in subapical area. Tibial tympana open on both sides. Knee lobes of all legs spinose. Fore coxa with a spine on dorsal margin; fore femur with 3 spines on ventro-internal margin, external margin mute; mid femur with 5 spines on ventro-external margin, internal margin mute; hind femur with 10–12 ventro-external and 7–8 ventro-internal spines; knee lobes of all femora spinose on both sides, hind knee lobes with one spine.

Male is unknown.

Female: Subgenital plate simply rounded; surface membranous, marginal area sclerotized and broadly bulging but interrupted at end in middle by a narrow membranous zone (Fig. 18). Ovipositor rather short, upcurved with acute tip (Fig. 19).

Colouration: Body and tegmen uniformly yellowish to reddish brown, probably discolored. Hind femur with a pre-genicular black spot that is more expressed on ventral than on dorsal side. The posterior spines on hind femur and most spines of hind tibia black with light tip. Tegmen subtransparent with distinct and little darkened veins and cross veins; resulting cells filled with minute uncolored veinlets. Hind wings transparent, along anterior margin yellowish.

Differential diagnosis: The new species is characteristic due to the presence of small but distinct spines at the lateral margins of pro-, meso-, and metazona of pronotum, the diagnostic characters of the genus *Phrictaetypus*. Also, the globose eyes and the long and narrow tegmen are typical for the genus. With 59 mm length, the tegmen is however distinctly longer than in all other species of the genus described so far (22–48 mm according to Willemse (1953; 1961)). In general habitus and with regard to the rather short lateral spines on lateral angles of pronotum, the new species agrees best with *P. aberrans* Willemse, 1961. It differs by the absence of black spots on tegmen and by the longer ovipositor (16 against 12 mm). The tegmen is of almost uniform width throughout in the new species (greatest subapical width 10.5 mm, narrowest subbasal width 10.0 mm) while it is markedly wider in subapical than in subbasal area in *P. aberrans* (12 against 9 mm). The black subapical ring on the hind femur and the black spines with light tips on hind tibia and in apical area of hind femur are also characteristic for the new species. From *Pseudophrictaetypus uniformis* Willemse, 1961 the new species differs by the possession of minute but distinct spines at the lateral angles of all three sections of the pronotum, the distinctly higher lateral lobes of pronotum, and the elongate tegmen with parallel-sided margins to nearly tip.

Huona Kuthy, 1910

Only one species was formerly known (OSF 2020): *H. variegata* Kuthy, 1910 from New Guinea, Huon Golf, Sattelberg. That species was also recorded by Naskrecki & Rentz (2011) from East New Britain, Nakanai Mountains, Lamas. The collection received from Dmitry Telnov contains an adult male from Biak Island that differs in diagnostic details to be worth the description of a new species and two photos of a nymph from Misool Island. The photos show enough details to identify the individual as belonging to the genus *Huona*, but not to assign it to a distinct species. The latter record extends the known distribution of the genus even further west. The known distribution of the genus *Huona* thus extends from Misool Island in the west to New Britain in the east.

***Huona inarmata* sp. nov.** (Figs 2, 9–12 & 20)

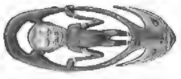
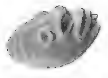
Holotype ♂ (3261564) NMEG: Indonesia E, Papua Prov., Cenderawasih Bay, Biak Is. W, Biak ca 16 km W, between Urfu & Yendidori, approx. 1°8'S, 135°57'E, 65–35 m, 21.iii.2018, secondary lowland rainforest on limestone, night collecting.

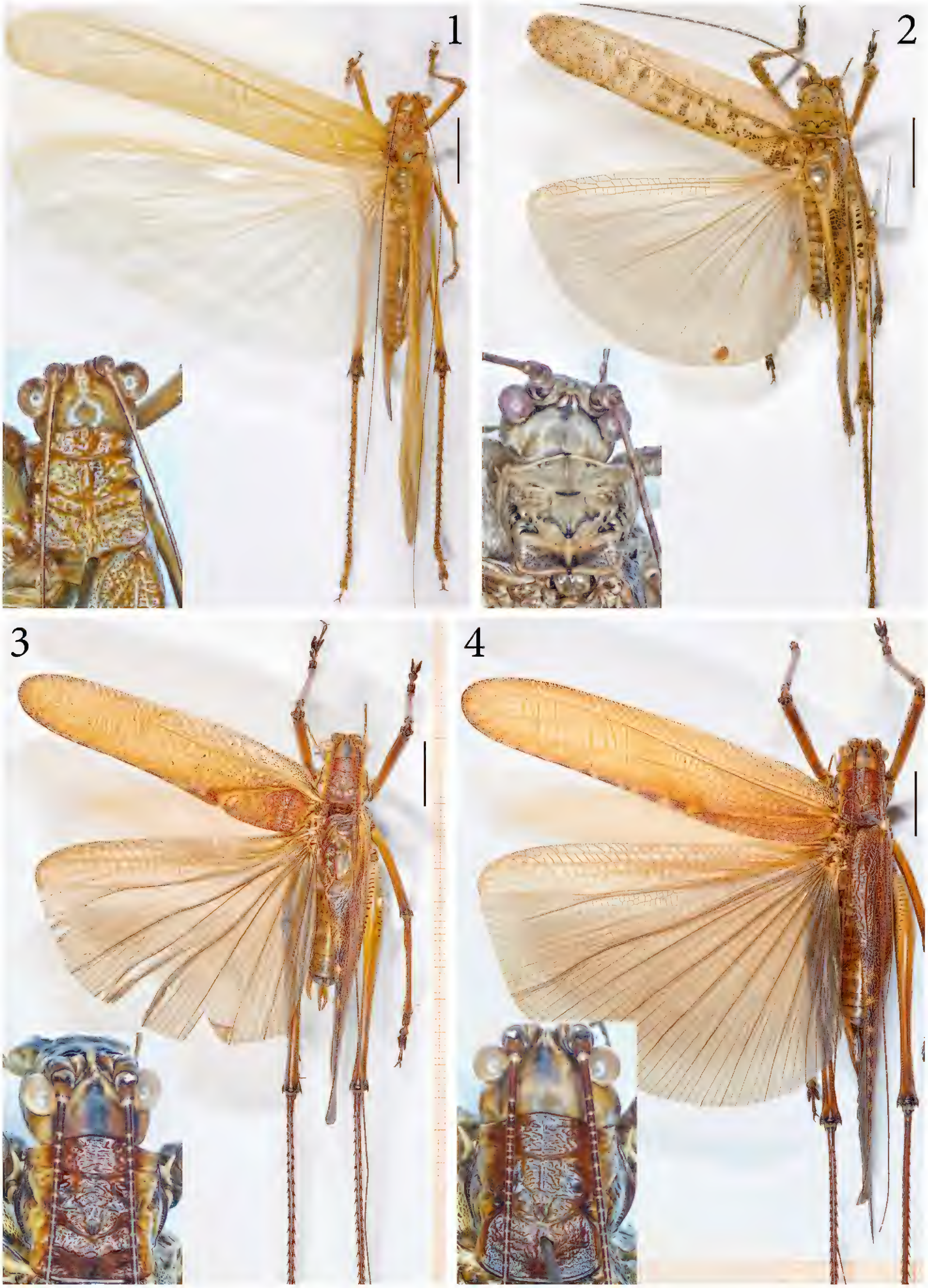
Derivatio nominis: The name of the new species refers to the absence of a crest with elevated teeth at the lateral margins of the metazona of pronotum; from Latin *inarmatus, inarmata* unarmed.

Measurements, holotype ♂: Body length with wings 51 mm, body without wings 30 mm, pronotum length 6 mm, tegmen length 41 mm, hind femur length 33 mm, tegmen width near base 9.5 mm, in middle 8.5 mm, antenna broken, longest rest 77 mm.

Description: Fully winged species with narrow tegmen that little surpasses the hind knees (Fig. 2). Head globular, rather small, with eyes little projecting lateral; fastigium verticis narrow and deeply furrowed in midline, separated by an angular incision from fastigium frontis; lateral ocelli inserted at the lateral surfaces of fastigium verticis, median ocellus at tip of fastigium frontis. Antennal scrobae with internal margin strongly elevated (Fig. 11). Mandibles with external surface markedly impressed. Pronotum rather short with anterior margin convex in middle, concave at both sides, hind margin faintly convex, ventral margins rounded, without humeral sinus; with two transverse furrows; dorsal surface in pro- and mesozona convex and with rounded lateral margins, metazona flat with a stout median keel and angular lateral margins. Tegmen rather narrow, in more than basal half little wider than in apical area. Legs rather long and thin; fore coxa with a spine at dorsal margin; anterior tibia with tympana conchate at external, open at internal side; mid tibia in more than basal third wider than thereafter; fore femur with 4-5 spines on ventro-internal margin, external margin mute; mid femur with 5-6 spines on ventro-external margin, internal margin mute; hind femur with 13 ventro-external and 9 ventro-internal spines; knee lobes of all femora spinose on both sides, hind knee lobes with one spine.

Male: Stridulatory file on underside of left tegmen about 4.3 mm long, with over 250 teeth that are at base extremely dense and narrow and hardly countable, then gradually widening and increasing in size to about apical third and getting little denser again in about apical quarter; from behind middle to before apical quarter of file with 40 teeth per mm, in second quarter from base with about 56



Figures 1–4. Habitus in dorsal view with left wings spread; inserts: head and pronotum, enlarged. 1 – *Phrictaetypus brevispina* sp. nov., holotype ♀; 2 – *Huona inarmata* sp. nov., holotype ♂; 3–4 – *Mossula striatifrons* sp. nov., holotype ♂ (3) and paratype ♀ (4) [scale bars 10 mm].

teeth per mm increasing in size towards middle (Fig. 9). Mirror at base of right tegmen roughly oval, at internal side behind basal third partly covered by a rather low elevated frame that performs a U-shaped curve behind the mirror and then continuous as a low rim along the external margin of the mirror; scrapper little elevated and darkened, internal margin proximal of scrapper concave and then convex and strongly thickened, afterwards of normal shape (Fig. 10). Tenth abdominal tergite short, apart from the very basal area convexly projecting behind and incised in middle by an obtuse notch. Cerci moderately stout, not very long, straight with slightly converging margins from base, in about apical quarter curved mediad and strongly narrowed to obtuse tip that carries a small compressed tooth that is slightly curved proximad (Fig. 20). Subgenital plate elongate, in basal area moderately wide with convex lateral margins that are prolonged at end into stout, parallel, beam-like projections; styli strong but thinner than those projections and little shorter than the gap between the apical projections (Fig. 12). Phallus membranous.

Colouration: Pale yellowish to brownish. Face of general color, with a pair of black bands in ventral area of antennal scrobae; with pairs of small irregular black spots on lateral sides of fastigium verticis, below antennal scrobae, on clypeus, in lateral areas of mandibles, and on both sides of antennal scapus; on dorsal side of head with a black band to and behind antennal scrobae; furrow in fastigium verticis and a spot behind also black; pronotum of light color with black ornaments. Tegmen semi-transparent brownish with scattered black spots mainly behind radius and in apical area. Hind wings transparent with brownish veins. Legs of rather light color; fore and mid femora and tibiae with rather faint brown spots of various size, hind femur in about basal half on external, dorsal and internal sides with distinctly outlined black spots, partly of hieroglyphic appearance; posterior half and hind tibia with brownish spots as in fore legs. Most tergites brownish with black hind margins, the extension of the black color increases towards end of abdomen; male tenth abdominal tergite with two black spots in basal area and dark brown along hind margin and in midline; epiproct light with a black spot in middle; cerci of light color. Male subgenital plate at dorsal side blackish brown, at ventral side including styli light brownish, a large area at base of disc of light color with an oval black spot on both sides of base, the area behind the light spot dark brown with light dots, later black, lateral ascending areas black but not at apical projections.

Differential diagnosis: The new species resembles *H. variegata* Kuthy, 1910 in shape and coloration. It differs by larger size and longer wings from *H. variegata*. The metazona of pronotum has the anterior transverse bulge more expressed than in *H. variegata,* but the lateral angles of disc form an indistinct and weak carinula that carries at anterior angle a small tubercle instead of forming a crest with 2–3 spikes in *H. variegata*. Moreover, the hind femur at ventral margin carries numerous rather small spines of regular size that only faintly increase in size towards tip, instead of less numerous spines that are in about mid-length of large and partly very large size and decrease in length towards tip; the hind knees terminate into a short spine instead of a long spine, and the wart-shaped black spots on the external and dorsal sides of the hind femur follow a different pattern. The male subgenital plate has an apical incision which is distinctly longer than wide (about 7:5) rather than about quadrate, and male styli which are shorter than the apical incision instead of roughly equal length.

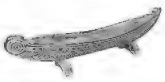
***Huona* sp.** (Figs 21–22)

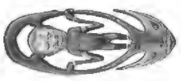
Image of a nymph, ♀ about third-last instar: Indonesia E, Raja Ampat, Misool Island, Lilinta (Lelintah) vill. env., 02°02’54”S, 130°16’19”E, 01.IV.2009, secondary lowland rainforest on limestone, observed by D. Telnov.

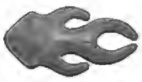
This is currently the westernmost known record of *Huona* Kuthy, 1910.

***Mossula* Walker, 1869**

Nine species have so far been assigned to this genus (OSF 2020): *M. caudelli* Karny, 1924 from Central Moluccas (Seram Island), *M. intermedia* Willemse, 1940 from New Britain, *M. kiriwina* Hebard, 1922 from Trobriand Islands (Kiriwina Islands), *M. loriae* Griffini, 1908 from New Guinea, Mt. Astrolaba, *M. purarica* Griffini, 1908 from Papua New Guinea, on Purari River, *M. salomonis* Kirby, 1891 from Solomon Islands (Malaita, New Georgia, Bougainville), *M. toxopei* Karny, 1926 from Central Moluccas (Buru Island), *M. variopicta* Willemse, 1961 from the Solomon Islands (Malaita and Auki), and *M. vitticollis* Walker, 1869 without known locality data. According to the key in Willemse (1961), the new species is most similar to *M. variopicta* Willemse, 1961 from Malaita.







***Mossula striatifrons* sp. nov.** (Figs 3–8 & 13–15)
Holotype ♂ (3261565) NMEG: Indonesia E, New Guinea, Papua Prov., Star Mountains, Oksibil 13.5–19.5 km SSE, 04°59'33''S, 140°42'2''E to 05°03'02''S, 140°43'16''E, elev. 780–380 m, 14.iii.2018, primary lowland rain forest, at base of young *Pandanus*'s leaves. Paratypus 1♀ (3261566) NMEG: same data as holotype.

Derivatio nominis: The name of the new species refers to the striped face; from Latin *stria* stripe, band and *frons* face.

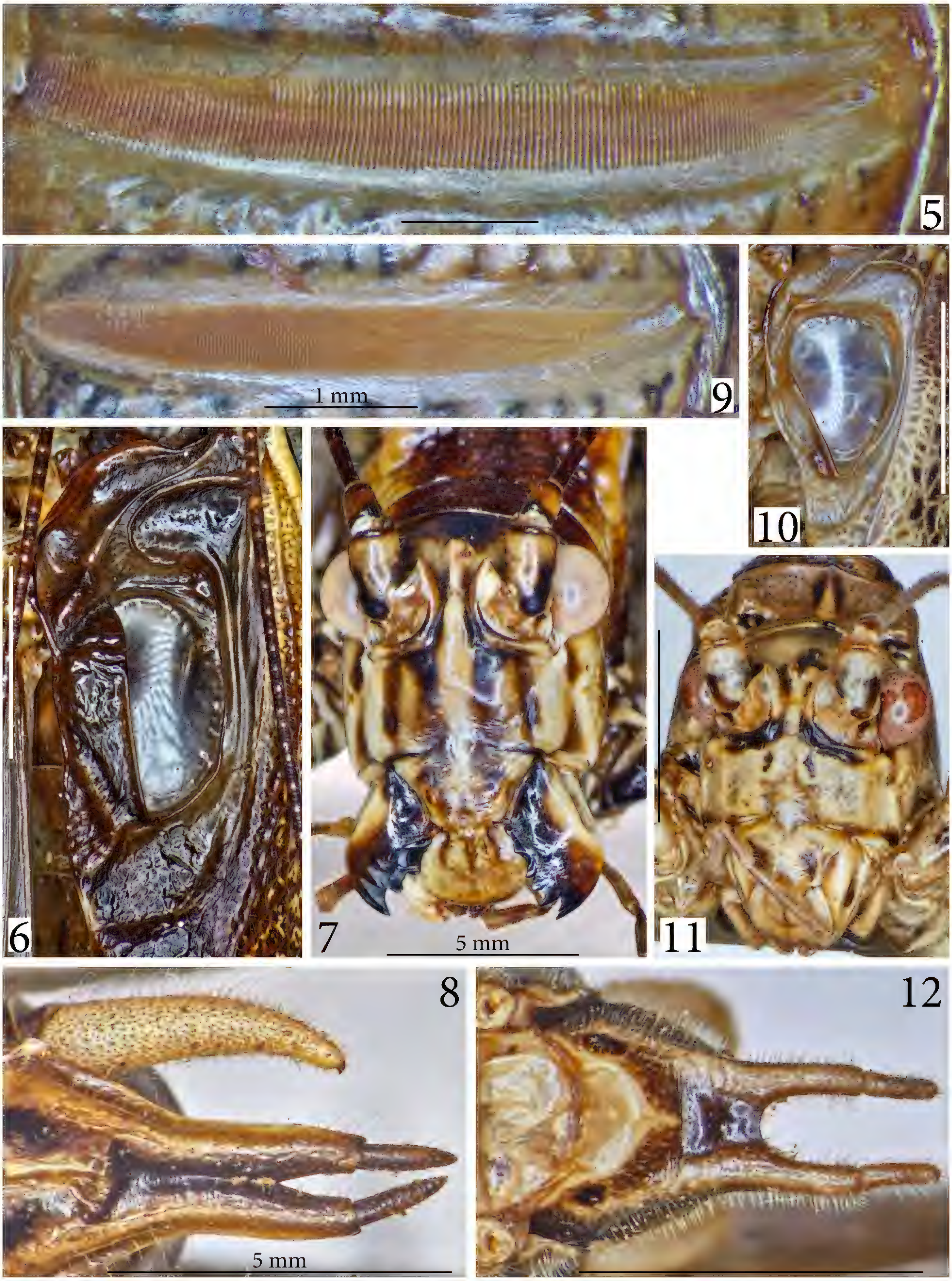
Measurements, holotype ♂: Body length with wings 59 mm, body without wings 41 mm, pronotum length 6.7 mm, tegmen length 47.5 mm, hind femur length 37 mm, tegmen width 11.5–12.0 mm in basal area, 9.5–10.0 mm in apical area, antenna length 135 mm. Measurements, paratype ♀: Body length with wings 70 mm, body without wings 42 mm, pronotum length 8.5 mm, tegmen length 59 mm, hind femur 41 mm, mean tegmen width 12.5 mm (12.8 mm near base, 11.9 mm in subapical area), antenna length 100 mm, ovipositor length 38 mm.

Description: Fully winged species with tegmen surpassing the hind knees, in male less so than in female; in female almost reaching tip of ovipositor. Male tegmen in basal half distinctly wider than in apical third, female tegmen faintly and more gradually narrowing to tip; surface of tegmen appears rugose due to a fine meshwork of minute veinlets, but main veins distinct (Figs 3–4). Head large, eyes globular, little projecting laterad; fastigium verticis triangular with narrow, furrowed tip, separated by an angular step from fastigium frontis; lateral ocelli inserted at lateral surfaces of fastigium verticis, median ocellus below middle of fastigium frontis; antennal scrobae with internal margin strongly elevated; mandibles with external surface markedly depressed with concave surface (Fig. 7). Pronotum with anterior margin convex in middle, faintly concave at both sides, hind margin faintly convex, ventral margin convex in middle, humeral sinus simply curved; with two deep transverse furrows; dorsal surface in pro- and mesozona coarsely rugose with lateral margins rounded into paranota, in metazona finely rugose with lateral margins rounded-angular; metazona with indication of a faint medial carina. Auditory spiracle long oval, in situ hidden under pronotum. Prosternal lobes triangularly projecting with acute tip; meso- and metasternal lobes wide, flattened, with a minute angular projection at apico-lateral angles; the apico-internal margins of the mesosternal lobes deviating posteriorly while those of the metasternal lobes are expanded on internal side leaving only a narrow oval gap between them with the rounded internal angles almost touching each other at end (Fig. 15). Legs rather long and narrow; anterior coxa with a spine on dorsal margin; anterior femur with 3–5 internal but no external spines, mid femur with 5–6 external but no internal spines, hind femur with 7–10 internal and 10–11 external spines; all tibiae with spines on both ventral angles, fore and mid tibiae also with small spines on dorsal posterior angle, hind tibiae with large spines on both dorsal angles; all spines at femora and tibiae black; tibial tympana semi-conchate leaving the greatest part of tympanum uncovered (Fig. 13); mid tibia of both sexes markedly thickened in basal third.

Male: Stridulatory file on underside of left tegmen about 6.56 mm long, with about 210 teeth that are very dense and narrow at base, increasing in size in about basal quarter and getting little denser again in about apical quarter; in middle of file with 20 teeth per one mm (Fig. 5). Mirror at base of right tegmen long oval, at internal side covered by a curved frame that is wider in anterior half than in posterior half; scrapper thickened, black, internal margin proximal of scrapper concave and then convex and strongly thickened (Fig. 6). Tenth abdominal tergite for the most part black, rather short; hind margin except near lateral angles convexly projecting, in middle notched with rounded bottom; epiproct with rounded apical margin; cerci elongate with faintly converging margins, in about apical third more strongly narrowed and slightly curved mediad, apex rounded with acute, recurved tooth at top. Epiproct about triangular with widely rounded tip, surface grooved. Phallus membranous. Subgenital plate elongate, in about basal half wider with convex lateral margins, in apical half narrow elongate and parallel-sided with a medial furrow, margins heightened throughout, apex incised; styli about as long as apical incision (Fig. 8).

Female: Subgenital plate with convex, upcurved lateral margins, continued seamlessly into bilobate apical margin; baso-lateral angles with a small depression (Fig. 14). Ovipositor about as long as body, substraight, in about apical half very faintly upcurved, tip acute (Fig. 13).

Colouration: General color reddish brown. Face whitish brown with six vertical dark brown bands, the central bands continued at clypeus; part of ventral and internal marginal area of antennal scrobae black; scapus with two large black spots, pedicellus with basal and apical margins black,



Figures 5–12. Stridulatory file on underside of left tegmen (5, 9), mirror at base of right tegmen (6, 10), face (7, 11) and subgenital plate (8, 12) of males of: 5–8 – *Mossula striatifrons* sp. nov., holotype; 9–12 – *Huona inarmata* sp. nov., holotype [scale bars 1 mm (figures 5 & 9) and 5 mm (figures 6–8, 10–12)].

flagellum fully black; mandibles whitish with a black spot in depressed lateral area, apical area brown, teeth black but at rest hidden under labrum; vertex medium to dark brown, in male with three longitudinal black bands: in midline and behind eyes; in female black bands incomplete; abdominal tergites dark brown, male tenth abdominal tergite black, in female last tergite black in central area; pronotum dark reddish brown, disc with apical rim black, paranota with a light yellowish brown band in upper half; tegmen brown, dorsal area little darker, with black spots along hind margin and black dots along fore margin; hind wings greyish semi-transparent, anterior area brownish; legs reddish brown but coxa, trochanter and basal area of hind femur yellowish brown, knees blackish; coxae and trochanter with few dark spots; fore and mid femora with indication of fine striation; hind femur with distinct striation of parallel dark strokes in about basal half and a black stroke along ventral margin; spines of all legs black. Abdominal tergites with a small black spot in lateral areas, especially distinct in male. Female subgenital plate medium brown, in apical area light brown; ovipositor brown, little lighter in basal area with a black band at base of ventral valves. Male tenth abdominal tergite black, little lighter in lateral areas; epiproct black with light margin; subgenital plate light to medium brown with furrow at dorsal side dark brown, at ventral side black and with two black spots in basal area; styli black.

Differential diagnosis: The new species resembles *M. variopicta* Willemse, 1961 in general shape and coloration. In both species, males have shorter wings than females, but in *M. striatifrons* sp. nov. the male tegmen is rather suddenly narrowed in mid-length, and surpasses the hind knees instead of being gradually narrowed to tip, and does not reach the hind knees in *M. variopicta*. The female tegmen is gradually narrowed from base to tip and almost reaches the end of the long ovipositor in *M. striatifrons* sp. nov., instead of being suddenly narrowed before tip and little surpassing the hind knees in *M. variopicta*. The best diagnostic character is however the male cercus that markedly differs between both species. In *M. variopicta*, the male cercus consists of a rather short and stout trunk that narrows in apical area to the subacute tip ["process" as of Willemse (1961)], and it releases a blunt and narrow internal process dividing rectangularly from the cercus stem before it narrows. In contrast, in the new species, the male cercus is elongate with apical area little curved towards middle and with blunt tip, at which a small black hooked tooth is inserted. The female subgenital plate of the new species has the widely rounded hind margin only faintly incised in middle instead of with "a large triangularly rounded incision in middle" (Willemse 1961) in *M. variopicta*.

New records

Tettigoniidae Krauss, 1902
Conocephalinae Burmeister, 1838
Agraeciini Redtenbacher, 1891

***Eulobaspis dehaani* (Karny, 1920)**
Examined material: Indonesia: West Papua, Fak-Fak Peninsula [sic! Correct name is Onin Peninsula], Fak Fak 10 km E, Sakarteman River valley, elev. 100–300 m (2°56'54''S, 132°22'23''E), 26.ix.2010 (1♂ NMEG).

Remark: The species is known from several localities in West Papua (Ingrisch 2015).

***Eulobaspis variata* Ingrisch, 2015**
Examined material: Papua [New Guinea NW], Cenderawasih Bay, Biak Island, Biak W – 16 km W, between Urfu & Yendidori, elev. 35–65 m (1°8'S, 135°57'E), 21.iii.2018 (1♀ NMEG).

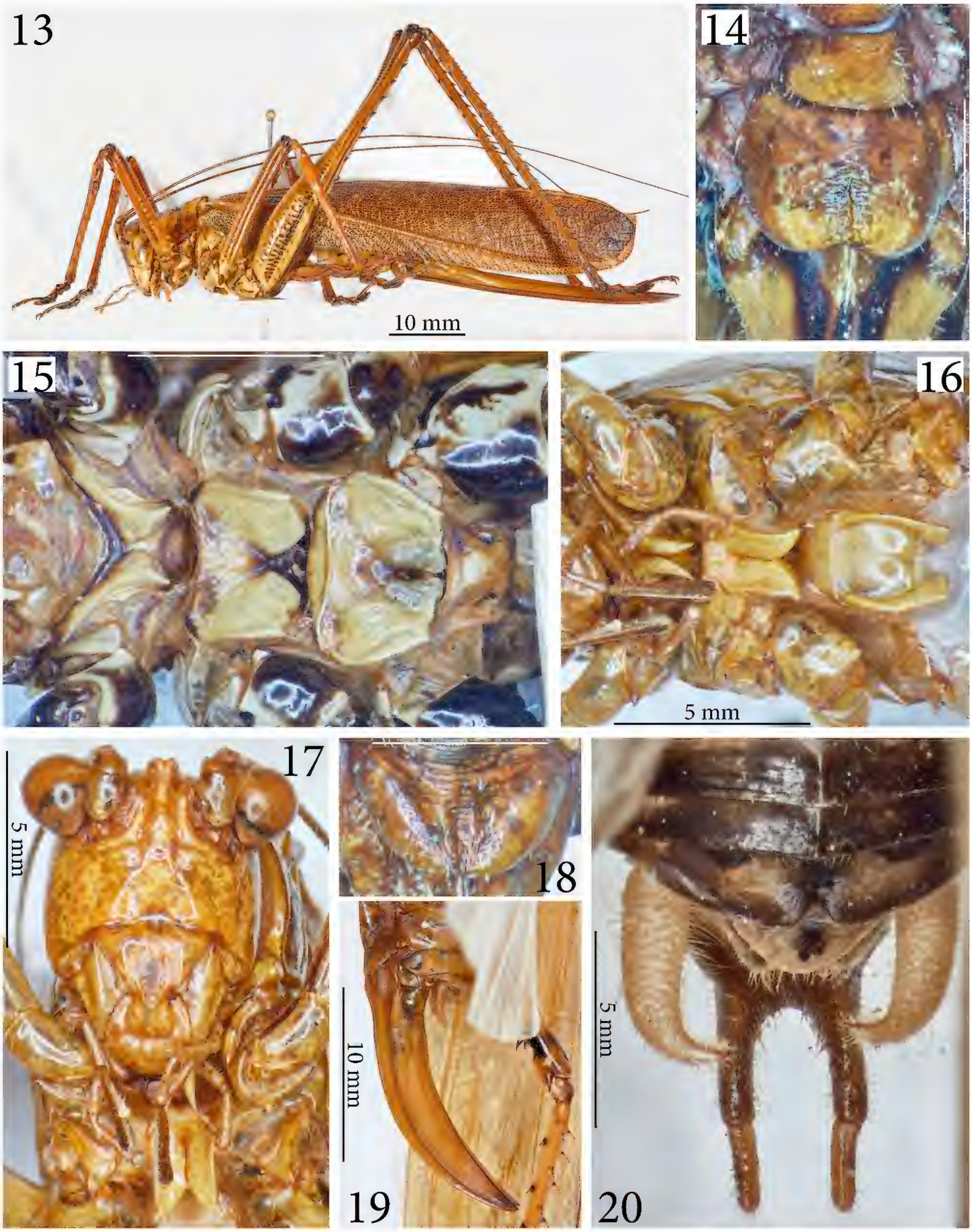
Remark: The species has been recently described from Biak Island (Ingrisch 2015). This is the second record for that species.

***Paramacroxiphus rufus* Ingrisch, 2008**
Examined material: Indonesia: Papua (New Guinea), Prov. Jayapura, Jayapura 21 km SSE, Koya Barat ≈ 8 km NE; Skouw vill. env., elev. 25–50 m (2°38'34''S, 140°52'6''E), 17.iii.2018 (1♀ NMEG).

Remarks: The species was so far known from several localities along the Sepik River in Papua New Guinea (Ingrisch 2008). This is the first record for the Jayapura area of Papua Province, Indonesia.

***Pseudomacroxiphus szentia* (Willemse, 1958)**
Examined material: Indonesia: Papua, Star Mountains, Oksibil 13.5–19.5 km SSE, elev. 380–780 m (4°59'33''S, 140°42'2''E), 14.iii.2018 (1♂ & 1♀ NMEG).

Remarks: That species is obviously widely distributed throughout New Guinea. It has been found along the central mountain ranges and at the south coast in both, Papua (Indonesia) and Papua New Guinea (Ingrisch 2008). Surroundings of Oksibil is a new locality record, although it had been recorded from the Star Mountains.



Figures 13–20. Habitus in lateral view (13), female subgenital plate (14, 18), thoracic sternites (15–16), face (17), ovipositor (19), male abdominal apex in dorsal view (20). 13–15 – *Mossula striatifrons* sp. nov., paratype ♀; 16–19 – *Phrictaetypus brevispina* sp. nov., holotype ♀; 20 – *Huona inarmata* sp. nov., holotype ♂ [scale bars 5 mm (figures 14–18 & 20) and 10 mm (figures 13 & 19)].

***Pseudonicsara* (*Cercana*) *spinibranchis* Ingrisch, 2009**

Examined material: Indonesia: Prov. Raja Ampat, Distr. Misool Barat, Lilinta (Lelintah) vill. env., (2°2’54’’S, 130°16’19’’E), 1.iv.2009 (1♀ NMEG).

Remarks: The species has been described from the Bintuni Bay area, Maccluer Gulf in West Papua Province (Ingrisch 2009). The new specimen is the first record for the Misool Island and Raja Ampat Islands.

***Rhytidaspis camela* Ingrisch, 2019** (Figs 23–26)

Examined material: Indonesia: E. Prov. Raja Ampat, Misool SW, Aduwey (Adua) vill. 2-5 km NNW, valley of River Hakau, (1°58’46’’S, 129°54’37’’E), 25-27.iii.2009 (1♂ & 1♀ NMEG); Indonesia: E. Prov. Raja Ampat, Misool SW, Aduwey (Adua) vill. 5 km NNW, valley of River Hakau, (1°58’46’’S, 129°54’37’’E), 26-29.iii.2009 (2♂ & 1♀ nymph, NMEG); Indonesia, West Papua, Tamarau Mts., Bamus Bama vill. env., 730 m (0°45’19’’S, 132°15’48’’E), 11-12.ii.2012 (1♂ NMEG).

Remarks: The genus *Rhytidaspis* Redtenbacher, 1891 comprises so far seven species and two subspecies, all with rather local distribution in the Indonesian part of New Guinea including one species from Waigeo Island. *R. camela* has been known so far from only two males from two localities in West Papua Province (Sorong and Komara) (Ingrisch 2019). The specimens from the valley of River Hakau are the first record of a species of the genus *Rhytidaspis* from Misool Island and Raja Ampat Islands while those from Bamus Bama fall within the previously known range of distribution. One of the three males from River Hakau shows an abnormal modification of the tenth abdominal tergite. The pair of beam-like apical lobes are fused to a single inflated cyst, while cerci and titillators show the typical shape of *R. camela*. The other two males from the same locality are fully normal.

The material from River Hakau also contains one adult female, which was formerly unknown. This is described below.

Description of the female: The subgenital plate of *R. camela* is similar to that of *R. arfak* Ingrisch, 2019 in ventral view but appears little stouter. As in the latter species, it has a faint angle of the lateral margins in about mid-length at the transition from a more strongly converging basal half to a less strongly converging apical half; at end, it is only shortly divided into two angular and faintly upcurved apical lobes with blunt tips (Fig. 26). The lateral areas of the subgenital plate are nearly angularly curved dorsad and especially in about basal half very high. In contrast to most other species of the genus these lateral lobes are nearly fully sclerotised and darkened and only little curved laterad in dorsal area (Fig. 25).

Colouration: Head, pronotum and abdomen red brown; abdominal tergites along lateral margins black. Tegmen yellow with black spots. Legs medium brown; femora with rows of black dots or strokes; spines of all legs with black tips or fully black. Subgenital plate with ventral surface black with a yellowish stroke in midline of apical half before apical excision and a medium brown spot at lateral angles in basal half; upcurved lateral lobes blackish brown along midline, medium brown along anterior and posterior margins but black at tip of lateral lobes. Ovipositor brown, darker towards end.

***Rhytidaspis* sp.** (Figs 27–29)

Examined material: Indonesia: West Papua, South Bird’s Neck, Kaimana 35-40 km East, Triton Bay, River Lengguru valley upriver from Oray vill. (3°43’26’’S, 134°6’6’’E), 200–300 m, 13.ix.2010 (1♀ NMEG); Kaimana 40 km East, Triton Bay, Lobo vill. env. (3°44’8’’S, 134°5’40’’E), 200–300 m, 15-17.ix.2010 (1♀ NMEG).

Remarks: The two females have been found in a locality that lies between the areas of *R. picta* Redtenbacher, 1891 in the north and west and *R. variata* Ingrisch, 2019 in the east. Although of general similar shape, the female subgenital plate shows small but clear differences to those in both other species (Figs 28–29). Compared to *R. picta*, the subgenital plate of the female from Triton Bay is in lateral view missing the short dorsal lobe in about half-length of the subgenital plate and the two apical lobes are shorter and blunt instead of narrow-elongate, closer together, and less strongly upcurved. Compared to *R. variata*, the subgenital plate is more elongate and less strongly curved in the two females from Triton Bay. They might represent an undescribed species. However, females of the genus *Rhytidaspis* show only weak differences in the diagnostic characters between species in contrast to the strong differences found in the male cerci and titillators, which are of high diagnostic value. It is thus reasonable to wait with the full identification until males from that locality become available.

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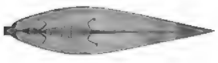

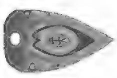

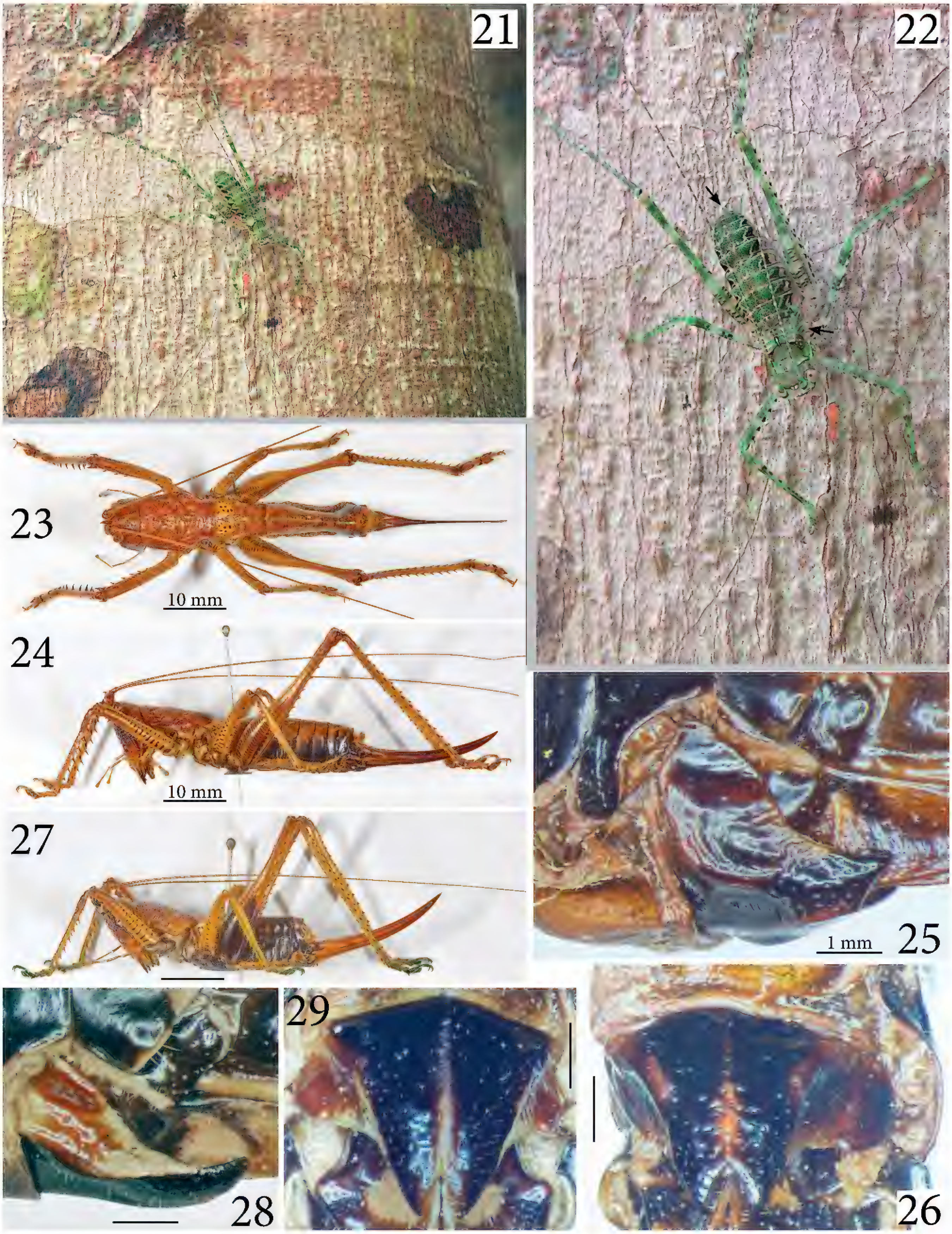

Figures 21–29. Habitus in dorsal view (21-23), habitus in lateral view (24, 27), female subgenital plate in lateral view (25, 28) and in ventral view (26, 29). 21–22 – *Huona* sp., nymph in about third last instar from environs of Lilinta village sitting on a tree trunk (21), close-up image, the arrows aim at the nymphal ovipositor and the lateral wing pads (22); 23–26 – *Rhytidaspis camela* Ingrisch, 2019, ♀ from River Hakau valley, Misool: 27–29 – *Rhytidaspis* sp. ♀ from Triton Bay, southern Bird's Neck, West Papua (images 21–22 courtesy Dmitry Telnov, the Entomological Society of Latvia, Rīga).

References

Brunner von Wattenwyl C. 1898. Orthopteren des Malayischen Archipels, gesammelt von Prof. Dr. W. Kükenthal in den Jahren 1893 und 1894. – *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft* **24**: 193–288, pls 16–20.

Cigliano M. M., Braun H., Eades D. C., Otte D. 2020. Orthoptera Species File. Version 5.0/5.0 http://Orthoptera.SpeciesFile.org [accessed: 02 August 2020].

Griffini A. 1908. Sopra alcuni Stenopelmatidi e sopra alcune Mecopodidi Malesi ed Austro-Malesi. – *Atti della Società Italiana di Scienze Naturali* **46**: 271–288.

Hebard M. 1922. Studies in Malayan, Melanesian and Australian Tettigoniidae (Orthoptera). – *Proceedings of the Academy of Natural Sciences of Philadelphia* **74**: 121–299, pls 11–22.

Ingrisch S. 2008. Revision of the genera *Paramacroxiphus* C. Willemse 1961 and *Pseudomacroxiphus* C. Willemse 1961 (Orthoptera: Tettigoniidae: Conocephalinae: Agraeciini). – *Zootaxa* **1755**: 1–34 https://doi.org/10.11646/zootaxa.1755.1.1

Ingrisch S. 2009. Revision of the genus *Pseudonicsara* Karny, 1912 (Orthoptera: Tettigoniidae: Conocephalinae: Agraeciini). – *Zootaxa* **2185**: 1–122 https://doi.org/10.11646/zootaxa.2185.1.1

Ingrisch S. 2015. A revision of the *Axylus* group of Agraeciini (Orthoptera: Tettigoniidae: Conocephalinae) and of some other species formerly included in *Nicsara* or *Anthracites*. – *Zootaxa* **4046**: 1–308 https://doi.org/10.11646/zootaxa.4046.1.1

Ingrisch S. 2019. Revision of the genus *Rhytidaspis* Redtenbacher, 1891 including the description of a new genus *Haudrhytidaspis* gen. nov. (Orthoptera: Tettigoniidae: Conocephalinae). – *Zootaxa* **4661**: 343–370 https://doi.org/10.11646/zootaxa.4661.2.5

Ingrisch S. 2020. New species and genera of Agraeciini (Orthoptera, Tettigoniidae, Conocephalinae) from New Guinea, Solomon Islands and Sulawesi. – *Zootaxa* **4821**, No 1: 1–48 https://doi.org/10.11646/zootaxa.4821.1.1

Jin X. & Kevan D. K. McE. 1992. Taxonomic revision and phylogeny of the tribe Phisidini (Insecta: Grylloptera: Meconematidae). – *Theses Zoologicae* **18**: 1–360.

Karny H. H. 1924. Beiträge zur Malayischen Orthopterenfauna. VIII. Die Mecopodinen des Buitenzorger Museums. – *Treubia* **5**: 137–160.

Karny H. H. 1926. Fauna Buruana. Orthoptera, Fam. Tettigoniidae. – *Treubia* **7**: 145–215, pl. 4.

Kirby W. F. 1891. Notes on the Orthopterous family Mecopodidae. – *Transactions of the Royal Entomological Society of London* 1891, No 3: 405–412.

Kuthy D. 1910. Orthoptera nonnulla nova in Nova-Guinea a Lud. Biró collecta. – *Annales Historico-Naturales Musei Nationalis Hungarici, Pars Zoologica* **8**: 213–216.

Liu C. X., Heller K. G., Wang X. S., Wu C., Liu F., Zhang T. 2020. Taxonomy of a katydid genus *Mecopoda* Serville (Orthoptera: Tettigoniidae, Mecopodinae) from East Asia. – *Zootaxa* **4758**, No 2: 296–310. https://doi.org/10.11646/zootaxa.4758.2.5

Naskrecki P., Rentz D. C. F. 2011. Chapter 11. A rapid assessment survey of katydids and relatives of the Muller Range (Insecta: Orthoptera: Ensifera): 168–174. *In:* Richards S. J., Gamui B. G. (eds) Rapid Biological Assessments of the Nakanai Mountains and the upper Strickland Basin: surveying the biodiversity of Papua New Guinea's sublime karst environments. – *RAP Bulletin of Biological Assessment* **60**: 2+260 pp.

Redtenbacher J. 1891. Monographie der Conocephaliden. – *Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien* **41**: 315–562, pls 3–4.

Walker F. 1869. *Catalogue of the specimens of Dermaptera Saltatoria in the collection of the British Museum. Part II. Catalogue of Locustidae*. London (British Museum of Natural History): iv + 225–423.

Willemse C. 1940. On a collection of Indo-Australian Tettigoniidae. – *Natuurhistorisch Maandblad* **29**: 60–64.

Willemse C. 1953. On a collection of Orthoptera from the Solomon Islands, chiefly from the Institut Royal des Sciences Naturelles de Belgique. – *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique* **29**: 1–27.

Willemse C. 1959. Notes on the genus *Salomona* Blanchard (Orthoptera, Tettigonioidea, subfam. Agraecinae). – *Publicaties van het Natuurhistorisch Genootschap in Limburg* **11**: 1–118, pls 1–43.

Willemse C. 1961. Tettigonoidea of the Papuan subregion (Orthoptera). 1. Mecopodidae. – *Pacific Insects* **3**: 93–116.

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